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EFFICACY REVIEW

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DATA ACCESSION NO(S). 456067-01,-02,-03,-04,-05,-06,-07,-08,-09,-10,-11,-12,-13,-14,-15,-16,-17,-18,-19,-20,-21,-22,-23,-24 & -25;
D281589; S611179; Case# 006590; AC:306

PRODUCT MGR. NO. 03-Layne/Sproat

PRODUCT NAME(S) K-Othrine® SC 5.0 Insecticide

COMPANY NAME Aventis Environmental Science USA LP

SUBMISSION PURPOSE Provide performance data in support of claims
for control of ticks, cat fleas, flies, cock-
roaches, ants, mosquitoes & arthropod pests.

CHEMICAL & FORMULATION Deltamethrin 4.75%
(0.42 lb. per gallon soluble concentrate)

CONCLUSIONS & RECOMMENDATIONS The data presented in EPA Accession
(MRID) Number 456067-01, having been obtained from standard field
testing meeting the requirements of § 95-11(b)(1)-(4) and (6) and
(7) on p. 268 and the standard of § 95-11(c)(2)(ii)(A)(b) on p. 270
of the Product Performance Guidelines, are adequate to demonstrate
the ability of a 0.06% solution of the subject product to control
lone star tick, *Amblyomma americanum*, on 2 half-mile hiking trails
in Wall Doxey State Park, Holly Spring, MS, during May and June of
1997, when applied at a rate of 2 gallons of spray to 320 meters of
trail length, since total tick control ranged from 74 to 100%. For
the entire first month, control averaged 87%. considered excellent
based on the small amount of solution actually applied.

Data presented in MRID No. 456067-02, meeting the same re-
quirements and the standard of § 95-11(c)(2)(ii)(A)(a) on p. 270 of
the Guidelines, are adequate to demonstrate the ability of a 0.01%
ready-to-use gel formulation to kill all lone star ticks coming in
contact with it within 3 hours when sprayed directly with about 1.0
gm of this product which is similar to the subject product.

Data presented in MRID No. 456067-03, meeting (to be continued)

the same requirements and standard, are adequate to demonstrate the ability of the same 0.01% ready-to-use gel formulation to produce 100% knockdown of nymphal deer tick, *Ixodes scapularis*, within 15 minutes and 100% mortality within 24 hours after exposure to a 1 gm per 100 sq.cm. deposit on glass plates.

Data presented in MRID No. 456067-04, having been obtained from a field test meeting the requirements of § 95-11(b)(1)-(4) and (6) and (7) on p. 268 and the standard of § 95-11(c)(2)(ii)(A)(b) on p. 270 of the Guidelines, are adequate to demonstrate the ability of the subject product to control American dog tick, *Derma-centor variabilis*, on 2 half-mile hiking trails in Wall Doxey State Park, Holly Springs, MS, for 1 month following application on May 22, 1998, at a rate of 2-1/2 gallons of spray to 320 meters of the trail. Control was 100% until late June, then fell off rapidly to only 33% at week 5 and to 0% at week 6.

Data presented in MRID No. 456067-05, having been obtained from a standard laboratory test meeting the requirements of § 95-11(b)(1) to (7) on p. 268 and the standard of § 95-11(c)(2)(ii)(A) subpart (a) on p. 270 of the Guidelines, are adequate to demonstrate the ability of the subject product to produce complete mortality on vinyl tile and ceramic tile of adult brown dog tick, *Rhipicephalus sanguineus*, of mixed sexes at 1 week after spraying the substrates at a rate of 1 gallon per 1,000 sq.ft. with a 0.03% solution. Mortalities at 2 weeks were 33% on vinyl tile and 67% on ceramic tile. Although initial control on concrete patio block was 75%, this had fallen to only 9% at 1 week.

Data presented in MRID No. 456067-06, having been obtained from a laboratory test simulating actual field application and meeting the requirements of § 95-11(b)(1) to (7) on p. 268 and the standard of § 95-11(c)(2)(ii)(A)(a) on p. 270 of the Guidelines, are adequate to demonstrate the ornamental application rate of the subject product at 0.0012% simulating hose-end application to control cat flea, *Ctenocephalides felis*, in turfgrass. The amount of water varied from 20 gallons, to 50 gallons and to 100 gallons per 1,000 sq.ft.

Data presented in MRID No. 456067-07, having been obtained from a laboratory test meeting requirements of § 95-11(b)(1)-(4) and (6) and (7) on p. 268 and the standard of § 95-11(c)(2)(ii)(A) subpart (a) on p. 270 of the Guidelines, are adequate to demonstrate the ability of the subject product to produce rapid knock-down of cat flea on carpeting with KT_{50} of 5.7 minutes for the 0.01% dilution and 4.9 for the 0.03% dilution and KT_{90} of 11.2 minutes for the 0.01% dilution and 8.9 minutes for the 0.03% dilution. 24-hour mortalities were 76% and 90%, respectively. Performance was not enhanced by addition of a surfactant to either concentration. The rate of application was 1 ml per 2-inch carpet circle, equivalent to 1.55 gallons per sq.ft.

Data presented in MRID No. 456067-08, having been obtained from a laboratory test meeting the same requirements and standard, are adequate to demonstrate the ability of the subject product to produce 73% and 67% knockdown for the 0.03% and 0.06% concentrations, respectively, of cat flea at 15 minutes and 100% and 90% mortality at 24 hours for the 2 respective concentrations when applied as a wet deposit to carpet circles at 0.74 ml (to be cont'd)

per 5 cm diameter circle, equivalent to 1.18 fl.oz. per sq.ft. In observations of dry residual efficacy, 0% knockdown was achieved at 15 minutes and <20% at 1 hour, with 24-hour mortality of 70-77% for the 0.03% and 0.06% dilutions, respectively, at 1 week. At 1 month knockdown activities remained the same as at 1 week, but 24-hour mortality has dropped again to 53-63% for the 0.03% and 0.06%.

Data presented in MRID No. 456067-09, having been obtained from a laboratory test meeting the same requirements and standard, are adequate to demonstrate the ability of the subject product to produce 40% knockdown with 0.03% and 53% knockdown with 0.06% of cat flea at 1 hour and 24-hour mortality of 66.7% at both dilutions following application of 0.74 ml per 5 cm carpet circle.

Data presented in MRID No. 456067-10, having been obtained from a standard laboratory test meeting requirements of § 95-11(b) subparts (1)-(4) and (6) and (7) on p. 268 and the standard of § 95-11(c)(1)(ii)(A) on p. 269 of the Guidelines, are adequate to demonstrate the ability of the subject product to produce knockdown of 100% at 15 minutes of adult stable fly, *Stomoxys calcitrans*, at 0.0025% when applied as a direct spray at the 2 gallons per 1,000 sq.ft. rate. 24-hour mortality was also 100%.

Data presented in MRID No. 456067-11, having been obtained from a standard laboratory test meeting the same requirements and standard, are adequate to demonstrate the ability of the subject product to produce KT_{50} of 7.2 minutes and KT_{90} of 9.5 minutes and 24-hour mortality of 100% of adult house fly, *Musca domestica*, when applied as a direct spray at the 2 gallons per 1,000 sq.ft. rate.

Data presented in MRID No. 456067-12, having been obtained from a standard laboratory test meeting the same requirements and standard, are adequate to demonstrate the ability of the subject product to produce 100% knockdown of adult house fly at 30 minutes and 100% mortality at 24 hours after exposure to 5-month-old residues on both ceramic tile and concrete; applications were made at 1 gm each per 121 sq.cm ceramic tile and 153.9 sq.cm concrete.

Data presented in MRID No. 456067-13, having been obtained from a standard laboratory test meeting the requirements of § 95-11 subpart (b)(1)-(4) and (6) and (7) on p. 268 and the standard of § 95-11(c)(2)(ii)(A)(a) on p. 270 of the Guidelines, are adequate to demonstrate the ability of the subject product to produce 100% mortality plus moribundity of brown dog tick on wet vinyl tile 3 days after being sprayed with 0.01% dilution at the 1 gallon per 1,000 sq.ft. rate, and this continued at 7 days after treatment. Results on wet filter paper were only 33% at 3 days and 53% at 7 days. In a parallel test using 4 stored products beetles, the subject product produced 93% mortality plus moribundity of warehouse beetle, *Trogoderma variabile*, 90% of red flour beetle, *Tribolium castaneum*, 67% of confused flour beetle, *T. confusum*, and 100% of sawtoothed grain beetle, *Oryzaephilus surinamensis*, at 24 hours following exposure to wet deposit of 0.01% dilution applied at 1 gallon per 1,000 sq.ft. to vinyl tile. At 3 days, the figures were 93%, 80%, 70% and 100%, respectively, and at 7 days 100% mortality against all 4 species was observed. Results with the same 4 species on wet filter paper at 24 hours were 87%, 47%, 53% and (to be continued)

97% with the 0.01% dilution; at 3 days 93%, 60%, 67% and 100%; and at 7 days 87%, 93%, 27% and 100%, applied at 1 gallon per 1,000 sq.ft. In the 1 week residual on ceramic tile against the same 4 species, the subject product failed to produce satisfactory control with the 0.01% dilution at any observation, the maximums at 7 days being 33%, 27%, 30% and 53%, respectively.

Data presented in MRID No. 456067-14, having been obtained from a standard laboratory test meeting the requirements of § 95-11 subpart (b)(1) to (7) on p. 268 and the standard of § 95-11(c)(2) subpart (ii)(A)(a) on p. 270 of the Guidelines, are adequate to demonstrate the ability of the 0.01% dilution of the subject product to produce total knockdown in 42 minutes and 100% mortality at 24 hours of American cockroach, *Periplaneta americana*; total knockdown in 21 minutes and 100% mortality at 24 hours of smokybrown cockroach, *P. fuliginosa*; total knockdown in 15 minutes and 100% mortality at 24 hours of Argentine ant, *Linepithema humile*; and total knockdown in 15 minutes and 100% mortality at 24 hours of red imported fire ant, *Solenopsis invicta*. The ornamental dilution of 0.0012% produced total knockdown in 30 minutes and 100% mortality at 24 hours of American cockroach; total knockdown in 27 minutes and 100% mortality at 24 hours of smokybrown cockroach; total knockdown in 15 minutes and 100% mortality at 24 hours of both the Argentine ant and red imported fire ant. Applications were made directly to the insects at the 1 gallon per 1,000 sq.ft. rate with the 0.01% dilution and at 1 gallon per 50 sq.ft. with the 0.0012%.

Data presented in MRID No. 456067-15, having been obtained from a standard laboratory test meeting the same requirements and standard are adequate to demonstrate the ability of the subject product to produce initial KT_{50} of 11.1 minutes and initial KT_{90} of 20.9 minutes and 100% mortality at 24 hours on ceramic tile and 21% knockdown at 15 minutes, 82% at 30 minutes and 100% at 60 minutes and 100% mortality at 24 hours on concrete of male German cockroach, *Blattella germanica*, with the 0.03% dilution applied at 1 gm per 121 sq.cm for ceramic tile and 1 gm per 153.9 sq.cm for concrete. At 1 hour after treatment, results were 23% KD at 15 minutes, and 100% KD at 30 and 60 minutes, with 100% mortality at 24 hours on concrete only, there being no tests on ceramic tile. At 1 week after treatment, results were KT_{50} of 12.0 and KT_{90} of 22.1 and 100% mortality at 24 hours on ceramic tile and 31% KD at 15, 76% KD at 30 and 100% KD at 60 minutes but only 45% mortality at 24 hours on concrete. At 2 weeks after treatment, results were 23% KD at 15, 93% KD at 30 and 97% KD at 60 minutes and 100% mortality at 24 hours on ceramic tile and 3% KD at 15, 83% KD at 30 and 100% KD at 60 minutes and 100% mortality at 24 hours on concrete. At 1 month after treatment, results were 30% KD at 15, 100% KD at 30 and 100% KD at 60 minutes and 100% mortality at 24 hours on ceramic tile and 7% KD at 15, 37% KD at 30 and 100% KD at 60 minutes and 100% mortality at 24 hours on concrete. At 2 months after treatment, results were KT_{50} of 25.2 and KT_{90} of >60 and 100% mortality at 24 hours on ceramic tile and 24% KD at 15, no recording for 30 and 90% KD at 60 minutes and 100% mortality at 24 hours on concrete. At 3 months after treatment, results (to be continued)

were KT_{50} of 15.8 and KT_{90} of 27.2 and 100% mortality at 24 hours on ceramic tile but only 3% KD at 15, 10% KD at 30 and 43% KD at 60 minutes and 83% mortality at 24 hours on concrete. In the same test using the same dilution with carpenter ants, the initial results were KT_{50} of 5.0 and KT_{90} of 8.4 and 100% mortality at 24 hours on ceramic tile and KT_{50} of 10.9 and KT_{90} of 18.0 and 100% mortality at 24 hours on concrete. At 1 hour after treatment, results were KT_{50} of 15.0 and KT_{90} of 29.8 and 100% mortality at 24 hours on ceramic tile only. At 1 week after treatment, results were 0% KD at 15, 93% KD at 30 and 100% at 60 minutes and 100% mortality at 24 hours on ceramic tile and 73% KD at 15, 100% at 30 and 60 minutes and 100% mortality at 24 hours on concrete. At 2 weeks after treatment, results were 19% KD at 15, 100% at 30 and 60 minutes and 100% mortality at 24 hours on ceramic tile and 13% KD at 15, 73% KD at 30 and 100% KD at 60 minutes and 100% mortality at 24 hours on concrete. At 1 month after treatment, results were 0% KD at 15, 100% KD at 30 and 60 minutes and 100% mortality at 24 hours on ceramic tile and 13% KD at 15, 100% KD at 30 and 60 minutes and 100% mortality at 24 hours on concrete. At 2 months after treatment, results were 29% KD at 15, 100% KD at 30 and 60 minutes and 100% mortality at 24 hours on ceramic tile and 21% KD at 15, 93% at 30 and 100% KD at 60 minutes and 100% mortality at 24 hours on concrete. At 3 months after treatment, results were 7% KD at 15, 80% KD at 30 and 100% KD at 60 minutes and 100% mortality at 24 hours on ceramic tile and 0% KD at 15, no recording for 30 and 100% KD at 60 minutes and 100% mortality at 24 hours on concrete. Finally, the same dilution used with adult house cricket, *Acheta domestica*, of mixed sexes, in the initial observation produced 13% KD at 15, 100% KD at 30 and 60 minutes and 100% mortality at 24 hours on ceramic tile and 7% KD at 15, 87% KD at 30 and 93% KD at 60 minutes and 100% mortality at 24 hours on concrete. At 1 hour after treatment, results were 13% KD at 15, 100% KD at 30 and 60 minutes and 100% mortality at 24 hours on ceramic tile only. At 1 week after treatment, results were 11% KD at 15, 56% KD at 30 and 100% KD at 60 minutes and 100% mortality at 24 hours on ceramic tile and 0% KD at 15, 33% KD at 30 and 67% KD at 60 minutes and 100% mortality at 24 hours on concrete. At 2 weeks after treatment, results were 73% KD at 15, 100% at 30 and 60 minutes and 100% mortality at 24 hours on ceramic tile and 14% KD at 15, 86% KD at 30 and 93% KD at 60 minutes and 100% mortality at 24 hours on concrete. At 1 month after treatment, results were 40% KD at 15, 100% at 30 and 60 minutes and 100% mortality at 24 hours on ceramic tile and 0% KD at 15, 47% KD at 30 and 87% KD at 60 minutes and 100% mortality at 24 hours on concrete. At 2 months after treatment, results were 13% KD at 15, 33% at 30 and 100% KD at 60 minutes and 100% mortality at 24 hours on ceramic tile and 0% KD at 15, no recording for 30 and 93% KD at 60 minutes and 100% mortality at 24 hours on concrete. At 3 months after treatment, results were 13% KD at 15, 100% KD at 30 and 60 minutes and 100% mortality at 24 hours on ceramic tile and 0% KD at 15, 20% KD at 30 and 93% KD at 60 minutes and only 87% mortality at 24 hours on concrete.

Data presented in MRID No. 456067-16, having (to be cont'd)

been obtained from a standard laboratory test meeting the same requirements and standard, are adequate to demonstrate the ability of the subject product at 0.0015% dilution to produce KT_{50} of 12.7 and KT_{90} of 21.4 minutes and 100% mortality at 24 hours in one test with adult male American cockroach, and KT_{50} of 13.1 and KT_{90} of 19.4 and 96% mortality at 24 hours in the second test. In the same test, results with Oriental cockroach, *Blattella orientalis*, were KT_{50} of 29.0 and KT_{90} of 48.8 and 100% mortality at 24 hours. Also included were results with adult house fly of mixed sexes, KT_{50} of 12.6 and KT_{90} of 15.9 and 100% mortality at 24 hours; and with adult house cricket, KT_{50} of 35.0 and KT_{90} of 52.5 and 100% mortality at 24 hours.

Data presented in MRID No. 456067-17, having been obtained from a standard laboratory test meeting the same requirements and standard, are adequate to demonstrate the ability of the subject product at 0.03% dilution to produce 93% mortality of male and nymphal American cockroach on patio concrete block at 1 week, 100% on soil and gravel at 1 week, and 67% on pine bark at 1 week. 4 week results were 50%, 47%, 100% and 7%, respectively, on the same substrates.

Data presented in MRID No. 456067-18, having been obtained from field testing meeting the requirements of § 95-11(b)(1)-(4) and (6) and (7) on p. 268 and the standard of § 95-11(c)(2)(ii)(A) subpart (a) on p. 270 of the Guidelines, are adequate to demonstrate the ability of the subject product at 0.03% dilution to produce 95.3% reduction in visits of Argentine ant workers to the outside of residences in Riverside, CA, in 1999 at 1 week, 88.4% reduction at 2 weeks, 86.2% reduction at 4 weeks and 64.7% reduction at 8 weeks, when applied at the 10.0 gallons per 1,000 sq.ft. rate to standard 2 x 6-ft barriers using 5 residences. The same rate applied to peripheral areas such as trash cans, bases of trees, stepping stones, etc., were not effective in reducing visits by Argentine ant workers.

Data presented in MRID No. 456067-19, having been obtained from a standard laboratory test meeting the same requirements and standard, are adequate to demonstrate the ability of the subject product at 0.03% dilution to produce initial mortality of 100% at 15 minutes and 1, 12, 24 and 48 hours on vinyl tile of pharaoh ant, *Monomorium pharaonis*, and initial mortality of 100% at 15 minutes and 1, 12, 24 and 48 hours on concrete plates. At day 7, results on both surfaces were 100% at all observations. At day 30, results were 89.20% at 15 minutes, 88.03% at 1 hour, 91.46% at 12 hours and 100% at 24 and 48 hours on vinyl tile and 72.84% at 15 minutes, 93.75% at 1 hour, and 100% at 12, 24 and 48 hours on concrete. At day 59, results were 24.76% at 15 minutes, 75.71% at 1 hour, and 100% at 12, 24 and 48 hours on vinyl tile and 44.19% at 15 minutes, 88.38% at 1 hour, and 100% at 12, 24 and 48 hours on concrete. At day 90, results were 75.29% at 15 minutes and 100% at 1, 12, 24 and 48 hours on vinyl tile and 38.72% at 15 minutes, 93.33% at 1 hour, 96.67% at 12 and 24 hours and 100% at 48 hours on concrete. With red imported fire ant, initial results were 100% at 15 minutes and 1, 12, 24 and 48 hours on vinyl tile and 96.67% at (to be contin'd)

15 minutes and 100% at 1, 12, 24 and 48 hours on concrete. At day 7, results were 68.22% at 15 minutes, 85.14% at 1 hour, and 100% at 12, 24 and 48 hours on vinyl tile and 64.46% at 15 minutes, 90.08% at 1 hour, and 100% at 12, 24 and 48 hours on concrete. At day 30, results were 74.31% at 15 minutes, 83.33% at 1 hour, and 100% at 12, 24 and 48 hours on vinyl tile and 34.95% at 15 minutes, 51.27% at 1 hour, 95.71% at 12 hours, and 100% at 24 and 48 hours on concrete. At day 60, results were 0% at 15 minutes, 3.15% at 1 hour, 84.19% at 12 hours, 98.67% at 24 hours and 100% at 48 hours on vinyl tile and 0% at 15 minutes and 1 hour, 33.00% at 12 hours, 63.25% at 24 hours and 97.50% at 48 hours on concrete. At day 90, results were 28.75% at 15 minutes, 95.79% at 1 hour, and 100% at 12, 24 and 48 hours on vinyl tile and 19.30% at 15 minutes, 55.72% at 1 hour, 88.28% at 12 hours, 93.74% at 24 hours and 100% at 48 hours on concrete. With crazy ant, *Paratrechina longicornis*, the initial results were 100% at 15 minutes, 1, 12, 24 and 48 hours on both vinyl tile and concrete. At day 7, results were 88.56% at 15 minutes, 100% at 1, 12, 24 and 48 hours on vinyl tile and 97.16% at 15 minutes, 100% at 1, 12, 24 and 48 hours on concrete. At day 30, results were 98.00% at 15 minutes and 1 hour, 98.18% at 12 and 24 hours, and 100% at 48 hours on vinyl tile and 91.67% at 15 minutes, 96.67% at 1 hour, 88.33% at 12 hours, 85.00% at 24 hours, and 90.00% at 48 hours on concrete. At 60 days, 97.24% at 15 minutes, 45.69% at 1 hour, and 100% at 12, 24 and 48 hours on vinyl tile and 58.51% at 15 minutes, 31.66% at 1 hour, 80.35% at 12 hours, 84.70% at 24 hours and 85.87% at 48 hours on concrete. At 90 days, results were 96.00% at 15 minutes, and 100% at 1, 12, 24 and 48 hours on vinyl tile and 15.82% at 15 minutes, 34.14% at 1 hour, 68.08% at 12 hours, 72.53% at 24 hours and 81.01% at 48 hours on concrete.

Data presented in MRID No. 456067-20, having been obtained from field testing conducted according to requirements of § 95-11 subpart (b)(1)-(4) and (6) and (7) on p. 268 and the standard of § 95-11(c)(2)(ii)(A)(b) on p. 270 of the Guidelines, are adequate to demonstrate the ability of the subject product at the 0.03% dilution to significantly reduce the number of worker pavement ants, *Tetramorium caespitum*, trapped in bait dishes with wet cat food placed near sidewalks in West Lafayette, IN in 1998 following spraying of the adjacent area at 1 gallon per 400 sq.ft., with 90% reduction at 7 days and >90% reduction at 14 days. In a residual test with the same dilution, unaged vinyl panels produced 100% mortality in 3 hours after treatment with 1 minute exposure time and 100% at 1 hour after treatment with 10 minutes exposure time. Panels aged 7 days with 1 minute exposure time produced a maximum mortality of 74.8% at 3 hours after treatment, and with 10 minutes exposure a maximum mortality of 96.7% at 3 hours after treatment. The application rate used was the same as in the field test.

Data presented in MRID No. 456067-21, having been obtained from field testing conducted according to the same requirements and standard, are adequate to demonstrate the ability of a ready-to-use product similar to the subject product and used at the same dilutions as stated on the label to greatly reduce (to be cont'd)

the number of worker Argentine ants visiting sucrose feeding stations placed on concrete stepping stones sprayed at the rate of 5 gallons per 1,000 sq.ft. by using pump spray bottles. The 0.01% resulted in a loss of 0.396 gm of sucrose solution at day 1 with 36.8 ants visiting, 0.499 gm at day 3 with 69.6 ants visiting, 0.331 gm at day 7 with 0 ants visiting, 0.853 gm at day 14 with 20.8 ants visiting, 1.053 gms at day 21 with 1.2 ants visiting, and 1.282 gms at days 28/33 with 0.6 ants visiting. The 0.03% resulted in a loss of 0.535 gm at day 1 with 14.4 ants visiting, 0.401 gm at day 3 with 3.0 ants visiting, 0.290 gm at day 7 with 32.0 ants visiting, 0.558 gm at day 14 with 0.2 ants visiting, 0.628 gm at day 21 with 1.0 ant visiting, and 0.804 gm at days 28/33 with 52.8 ants visiting. In the residual part of the test, the 0.01% product produced 20.2% mortality of worker ants continuously confined to concrete stepping stones aged 5 weeks by plastic rings at 1 hour, 40.4% at 2 hours, 67.9% at 4 hours, 90.8% at 8 hours and 98.2% at 24 hours. The 0.03% product produced 58.5% mortality at 1 hour, 65.2% at 2 hours, 90.7% at 4 hours, 98.3% at 8 hours and 100% at 24 hours.

Data presented in MRID No. 456067-22, having been obtained from a standard laboratory test meeting the requirements of § 95-11 subpart (b)(1)-(4) and (6) and (7) on p. 268 and the standard of § 95-11(c)(1)(i) on p. 269 of the Guidelines, are adequate to demonstrate the ability of the subject product at the 0.03% dilution to produce 0% knockdown of paper wasps, *Polistes* sp., at 1 minute after treatment with 2 ml directly sprayed into a screen cage containing the wasps, 11% KD at 2 minutes, 50% KD at 5 minutes, and 100% KD at 10, 15 and 60 minutes. Mortality results were 0% at 1 minute, 6% at 2 minutes, 39% at 5 minutes, 50% at 10 minutes and 100% at 15 and 60 minutes. While these results are sufficient to allow the claim for paper wasps to be placed on the label, in the words of the author, "the...liquid formulations had relatively slow knockdown (>5 minutes for >50%) and would not be suitable for applications requiring immediate knockdown of wasps".

Data presented in MRID No. 456067-23, having been obtained from a standard laboratory test meeting the same requirements and standard, are adequate to demonstrate the ability of the subject product to produce 0% knockdown of yellowjacket wasps, *Vespula* spp., at 15 minutes when the 0.01% dilution was applied as a direct spray of 1 second containing 3-6 gms of product from a distance of 45 cm, 88% KD at 30 minutes, 100% KD at 60 minutes and 100% mortality at 24 hours.

Data presented in MRID No. 456067-24, having been obtained from a standard laboratory test meeting the requirements of § 95-11 (b)(1)-(4) and (6) and (7) on p. 268 and the standard of § 95-11(c) subpart (2)(ii)(B)(a) on p. 270 of the Guidelines, are adequate to demonstrate the ability of a formulation with half the concentration of active ingredient before dilution to kill adult female mosquito, *Anopheles arabiensis*, resting on ceramic tiles, unpainted plywood and concrete plates for as little as 12.5-13.7 minutes, 24.2-19.8 minutes and >30 minutes, respectively for the 2 rates of application, 6.25 mg per sq.m and 12.5 mg per sq.m (to be contin'd)

of a solution having a deposition of 0.58 mg a.i. per sq.ft. and 1.16 mg a.i. per sq.ft. The actual results with fresh deposits were with 6.25 mg per sq.m KT_{50} of 7.9 minutes, KT_{95} of 12.5 minutes and 100% mortality at 1 day and 6 days on ceramic tiles; KT_{50} of 13.9, KT_{95} of 24.2 and 100% mortality at 1 day and 6 days on unpainted plywood; and KT_{50} of 22.9, KT_{95} of >30 and 100% mortality at 1 day and 6 days on concrete plates. With 12.5 mg per sq.m KT_{50} of 7.5, KT_{95} of 13.7 and 100% mortality at 1 day and 6 days on ceramic tiles; KT_{50} of 9.3, KT_{95} of 19.8 and 100% mortality at 1 day and 6 days on unpainted plywood; and KT_{50} of 15.7, KT_{95} of >30 and 100% mortality at 1 day and 6 days on concrete plates. Actual results with 30-day old residues were with 6.25 mg per sq.m KT_{50} of 6, KT_{95} of 10 and 100% mortality at 1 day and 6 days on ceramic tiles; KT_{50} of 13.5, KT_{95} of 23.6 and 100% mortality at 1 day and 6 days on unpainted plywood; KT_{50} of >30, no recorded KT_{95} , 92% mortality at 1 day and 100% mortality at 6 days on concrete plates. With 12.5 mg per sq.m KT_{50} of 5.9, KT_{95} of 12.1 and 100% mortality at 1 day and 6 days on ceramic tiles; KT_{50} of 10.5, KT_{95} of 17.5 and 100% mortality at 1 day and 6 days on unpainted plywood; KT_{50} of 25.9, KT_{95} of >30 and 100% mortality at 1 day and 6 days on concrete plates. Actual results with 90-day old residues were with 6.25 mg per sq.m KT_{50} of 8.2, KT_{95} of 13.6 and 100% mortality at 1 day and 6 days on ceramic tiles; KT_{50} of 11, KT_{95} of 14.7 and 100% mortality at 1 day and 6 days on unpainted plywood; KT_{50} of >30, no recorded KT_{95} , 95% mortality at 1 day and 100% mortality at 6 days on concrete plates. With 12.5 mg per sq.m KT_{50} of 6.5, KT_{95} of 11.9 and 100% mortality at 1 day and 6 days on ceramic tiles; KT_{50} of 10.9, KT_{95} of 18.4 and 100% mortality at 1 day and 6 days on unpainted plywood; KT_{50} of >30, no recorded KT_{95} , and 100% mortality at 1 day and 6 days on concrete plates.

Data presented in MRID No. 456067-25, having been obtained from a standard laboratory test meeting the requirements of § 95-11 subpart (b) (1)-(4) and (6) and (7) on p. 268 and the standard of § 95-11(c) (2) (ii) (A) (a) on p. 270 of the Guidelines, are adequate to demonstrate the ability of the subject product when diluted as per label directions to control selected pestiferous arthropod species, namely millipedes, brown dog tick, American dog tick, funnel spider, black widow spider (*Latrodectus hesperus*), striped-tail scorpion (*Vejovis spinigerus*), centipedes (*Scolopendra* spp.), cellar spiders, boxelder bug, earwig (*Forficula auricularia*), Argentine ant and odorous house ant (*Tapinoma sessile*). The subject product was 100% efficacious against millipedes on treated concrete and on treated soil/mulch substrate after 7 days of outdoor exposure. The subject product demonstrated 100% mortality of brown dog tick and American dog tick at 2 hours post-treatment when applied to either concrete or soil/mulch substrates. The subject product demonstrated 100% mortality of funnel spiders 8 hours post-treatment with direct application to caged spiders on their webs. The subject product demonstrated 100% mortality of black widow spiders 24 hours post-treatment with direct application to caged spiders on their webs. The subject product was the only formulation demonstrating 80 and 100% mortality after 8 and 24 hours (to be cont'd)

exposure, respectively, after 1 month of outdoor exposure. The subject product demonstrated 100% mortality of centipedes at the 8 hour data point; however, 20% of the test organisms recovered from the exposure at the 24 hour data point; only the subject product gave acceptable efficacy (100% mortality) at the 30 day residual data point. The subject product demonstrated 66.7% mortality of caged cellar spiders with a direct contact application. The subject product produced 88% mortality of boxelder bug nymphs at 2 and 4 hours after treatment, 92% at 8 hours and 100% at 24 hours after exposure to 1 month residues; initial treatment of nymphs produced 48% mortality at 60 minutes, 82% at 90, 90% at 2 hours, 98% at 4, and 100% at 6, 8 and 24 hours; initial treatment of adults produced 100% mortality at 30, 60 and 90 minutes and 2, 4 and 24 hours, this and the two preceding tests being in wire cages; 84% at 30 minutes, 96% at 60 minutes, and 100% at 90 minutes and 2, 4 and 24 hours, on soil. The subject product produced 28% mortality of earwigs at 30 minutes on concrete, 100% at 1 hour, 98% at 2 and 4 and 100% at 8 and 24 hours; with initial application, 20% mortality at 30 minutes, 60% at 1 hour, and 100% at 2, 4, 8 and 24 hours. The results for Argentine ant and odorous house ant are incomplete and no results were presented for the rain wash-off study using harvester ants. However, these claims are acceptable on the basis of data presented in MRID Nos. 456067-14, 456067-18 and 456067-21 previously discussed. The highlighted claims for wood-infesting beetles and fire ants in the pest list on p. 2 of the label are supported by previously reviewed data, and the claim for carpenter ants in the same table has also been accepted on the basis of previously reviewed data. The data presented in MRID No. 456067-13 support the lowest rates for use in grain bins and warehouses found on p. 3 of the label.

RL Vern L. McFarland, IB